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Effects of land use and climate changes on small reservoir siltation in the agricultural belt of European Russia

VLADIMIR R. BELYAEV[1], VALENTIN N. GOLOSOV[1,2], MAXIM V. MARKELOV[1], NADEZDA N. IVANOVA[1], EUGENIA N. SHAMSHURINA[1] & OLIVIER EVRARD[3]

1 Laboratory of Soil Erosion and Fluvial Processes, Faculty of Geography, Lomonosov Moscow State University, Leninskie Gory, GSP-1, Moscow 119991, Russia
vladimir.r.belyaev@gmail.com
2 Institute of Ecology and Geography, Kazan (Volga region) Federal University, 18, Kremlevskaya Street, Kazan 420008, Russia
3 Laboratoire des Sciences du Climat et de l'Environnement (LSCE/IPSL), Unité Mixte de Recherche 8212 (CEA/CNRS/UVSQ), Centre de Recherche du CNRS, Avenue de la Terrasse, 91 198 Gif-sur-Yvette Cedex, France

Abstract Small reservoirs of agriculture-dominated areas experience severely increased sediment input caused by soil erosion on cultivated slopes, also accompanied at some locations by gully erosion. This causes rapid decrease of the reservoir water storage and shortened periods of functioning. In this paper we discuss several examples of the ^{137}Cs-based short-term siltation chronology of small reservoirs located in different landscape zones within the agricultural belt of European Russia. From two to four time marks could have been established in ^{137}Cs depth distribution curves constructed from detailed depth-incremental sampling of reservoir infill sediment, allowing reconstruction of sediment microstratigraphy and deposition rates. In combination with other independent information sources this provides insight on the relative importance of recent land use changes and climatic variability in controlling sediment delivery within small agriculture-dominated fluvial systems. In combination with sediment redistribution studies, it has become possible to construct closed sediment budgets for catchments of several reservoirs and make a quantitative assessment of sediment delivery variability. Such information is important for appropriate design and management of small agricultural reservoirs in Russia.

Key words small reservoirs; siltation; agricultural land; soil erosion; sediment delivery; ^{137}Cs depth distribution; microstratigraphy; deposition rates; climate changes; European Russia